Mid Essex Hospital Services NHS
NHS Trust

FETAL HEART RATE MONITORING IN PREGNANCY AND LABOUR	CLINICAL GUIDELINES Register No 04265 Status: Public

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Consulted With	Individual/Body	Date
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Review No	Reviewed by	Review Date
1.0	Julie Bishop and Jan Hayes	January 2008
2.0	Dr Mohan	June 2009
2.1	Amendments to point 7.0 and 14.0	July 2009
2.3	Clarification to 6.3	February 2010
2.5	Clarification to points 3.2, 7.4, 8.1 and 9.0	November 2010
3.0	Sarah Moon	January 2012
3.1	Sarah Moon - Clarification to 6.0	May 2012

It is the personal responsibility of the individual referring to this document to ensure that they are viewing the latest version which will always be the document on the intranet

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1.0 Purpose of Guideline

1.1 Fetal hypoxia is associated with abnormal heart changes and thus monitoring of the fetal heart changes assists in identifying the hypoxaemic fetus.

1.2 Electronic fetal monitoring (EFM) / cardiotocography (CTG) is used in standard obstetric practise for interpreting indirect fetal hypoxia.

1.3 Recognising abnormal patterns, interpreting EFM and initiating necessary actions reduces perinatal morbidity and mortality.

2.0 Equality and Diversity

2.1 Mid Essex Hospitals is committed to the provision of a service that is fair, accessible and meets the needs of all individuals.

3.0 What can go wrong?

3.1 Misinterpretation of EFM, inappropriate action or a delayed response and the inappropriate use of oxytocin.

3.2 Equipment errors and techniques of using EFM tools. Do not rely solely on the CTG trace for fetal wellbeing. Be aware of limitations and artefacts i.e. doubling of maternal pulse being recorded as fetal heart.

3.3 Inadequate record keeping and communications; poor supervision and staffing.

4.0 Classification of EFM

4.1 Appropriate classification of each component of EFM is important prior to defining the CTG.
(Refer to Appendix A for classification of EFM)

5.0 Definition of EFM

5.1 From the classification referred to in appendix A, each CTG should be defined as below.

- **Normal:** All four features are classified as reassuring.
- **Suspicious:** One feature classified as non-reassuring and the remaining features classified as reassuring.
- **Pathological:** Two or more features classified as non-reassuring or one or more classified as abnormal.

6.0 Intermittent auscultation

6.1 Intermittent auscultation of the fetal heart rate (FHR) is recommended for low-risk patients in labour, with the aid of a pinnard or sonicaid; and once in established labour these findings should be recorded on the partogram and in the healthcare records.
(Refer to ‘Guideline for the completion of the partogram in pregnancy’, register number 09046)

6.2 Initial auscultation of the FHR is recommended at the first contact in early labour and at each further assessment undertaken to determine whether labour has become established.

6.3 Best practice recommends that the midwife caring for the patient should assess the FHR every 15 minutes after a contraction during the first stage of labour; however, if the circumstances prevent this assessment occurring, the midwife should refer to point 6.4

6.4 If the midwife responsible for the patient is unable to assess the fetal heart rate as stipulated in point 6.3, the following reasons should be documented in the patient's healthcare records as outlined below:

- Vomitting
- Out to the toilet
- Patient declines assessment of FHR

6.5 Best practice recommends that the midwife caring for the patient should assess the FHR every 5 minutes after a contraction during the second stage of labour; however, if the circumstances prevent this assessment occurring refer to point 6.4

6.6 The maternal pulse should be palpated hourly simultaneously with the FHR assessment and recorded:

- During labour, to ensure that the correct assessment of FHR is recorded
- To monitor any deviations from the baseline assessment (maternal/fetal) on admission
- If an abnormality is detected to be able to differentiate the two heart rates

These observations should be recorded in the health care records

7.0 Transfer from intermittent Auscultation to Continuous EFM / indications for Continuous EFM

7.1 Significant meconium-stained liquor. Continuous EFM should also be considered for light meconium-stained liquor.
(Refer to the 'Guideline for the management of meconium stained liquor. Register number 04259)

7.2 Abnormal FHR by intermittent auscultation (<110bpm; >160bpm; any deceleration detected after a contraction).

7.3 Maternal pyrexia, fresh bleeding in labour, use of oxytocin in labour or the patient's request.

7.4 Increased risk groups warrant continuous EFM in labour as indicated below:

Maternal	Fetal	Intrapartum
Previous caesarean section Pre-eclampsia Postmature pregnancy>42 weeks Prolonged rupture of membranes>24 hours Induced labour (see below) Diabetes	Fetal growth restriction Prematurity < 37 weeks Multiple pregnancy Oligohydramnios Abnormal doppler artery velcimetry Breech presentation	Oxytocin augmentation Epidural anaesthesia Vaginal bleeding in labour Maternal pyrexia Significant meconium stained liquor Prolonged second stage.

Antepartum haemorrhage Medical conditions (individual care plan to be discussed with obstetric registrar/consultant on call) Drug and alcohol abuse **Second stage** if birth is not immenent: After **2 hours** of active pushing in a primigravida After 1 **hour** of active pushing in a multigravida	Significant meconium stained liquor Light MSL in the presence of additional risk factors Patient reporting a history of repeated episodes of reduced fetal movements History of reduced fetal movements within 24 hours of the onset of labour	

Every patient should be assessed as to their risk, which should be documented accurately and contemporaneously in the health care records. Please refer to the 'Guideline for maternity record keeping including documentation in handheld records', register number 06036).

8.0 Dawes Redman Criteria

8.1 The Antenatal Oxford CTG monitoring for the Dawes Redman Team Sonic Care monitor is available for antenatal use on the Day Assessment Unit (DAU).

8.2 Indications for use include reduced fetal movements, suspected growth restriction, ante-partum haemorrhage, twins, hypertension/ pre-eclampsia, reduced liquor volume, abnormal doppler velocimetry, maternal accidents/ injury, previous questionable FHR traces, or a poor obstetric history.

8.3 The Dawes Redman criteria can only be used in the absence of uterine activity (it can be used with Braxton-Hicks contractions) and also from 26 weeks gestation onwards.

9.0 Vaginal Birth After Caesarean Section (VBAC)

(Refer to the guideline entitled 'Vaginal birth after caesarean section' (06030)

9.1 VBAC patients should be offered continuous monitoring; thus if the patient is on Labour Ward the advice should be to continuously monitor their labour however, it is the patient's choice.

9.2 Patients should be offered birth primarily on the low risk Co-located Birthing-led Unit; furthermore, they should be informed that they will receive intermittent auscultation, no cannula etc and transferred to Labour Ward only if deviations from the norm are identified.

10.0 Additional information regarding EFM

10.1 It is imperative that the midwife caring for the patient checks that both the date and time on the EFM machines are correctly set, in line with NICE recommendations.

10.2 Confirm fetal heart beat with Pinnard or handheld Doppler:

- Before commencing the CTG monitoring

- After a period of normal CTG then a deviation from the normal occurs
- After a period of suspicious/pathological CTG tracing which then appears to recover

10.3 The midwife should document on the CTG tracing and in the patient's healthcare records 'auscultated with Pinnard/handheld Doppler'; including documentation of the date and time.

10.4 Confirm fetal heart rate using Pinnard of hand held Doppler if any clinical uncertainty.

10.5 If repeated accelerations are present with reduced variability, the FHR trace should be regarded as reassuring.

10.6 True early uniform decelerations are rare and benign, and therefore they are not significant.

10.7 Most decelerations in labour are variable.

10.8 CTG abnormalities - response if a CTG is suspicious (conservative measures)

Antenatal	Intrapartum
Repeat CTG and review history for risk factors Review and compare earlier CTG's (if applicable) Consider scan and doppler's Consider delivery (give betamethasone if delivery anticipated before 36 weeks gestation) Plan of care by obstetric registrar or consultant on call Involve obstetric consultant if gestation < 33 weeks	Poor quality CTG, check maternal pulse, check position of transducer, assess FHR using either a pinnard or sonicaid; consider applying fetal scalp electrode (FSE) . Check for hyper-contractility Is the mother receiving syntocinon? If yes stop infusion and inform obstetric registrar/consultant on call Has the mother recently received vaginal prostaglandins? If yes consider tocolysis (terbutaline 0.25mg s/c) Maternal tachycardia/pyrexia Maternal infection? Consider blood cultures and intrapartum intravenous antibiotics if temperature ≥37.8 Tocolytic infusion (ritodrine) Dehydrated? Check blood pressure; give 500ml of crystalloid if appropriate Change maternal position to left lateral Consider other causes i.e. recent vaginal examination, ARM, vomiting, just used a bedpan

10.9 Response if a CTG is pathological

Antenatal	Intrapartum
Get immediate help, including the obstetric registrar or consultant and labour ward co-ordinator Whilst carrying out appropriate conservative measures prepare for operative delivery, ascertain level of urgency If not obtained already take blood for group and save and X-match If a patient is identified as having a pathological CTG on any ward other than Labour Ward, transfer to theatre should be arranged from that ward in order to avoid any unnecessary delay	Get immediate help Summon the obstetric registrar or consultant and labour ward coordinator Whilst waiting for help to arrive carry out appropriate conservative measures (see table above) If no contraindications perform a FBS If not possible plan for immediate delivery, ascertaining level of urgency. Action is essential

10.10 There should be a good quality CTG to provide an accurate precise tracing assisting to identify abnormal heart changes associated with fetal hypoxia. If there is an inability to maintain a good quality trace with an abdominal transducer i.e. loss of contact, a fetal scalp electrode must be applied. The labour ward co-ordinator and obstetrician should be informed of a poor quality trace where a fetal scalp electrode cannot be applied.
For contraindications, refer to Guideline entitled 'Fetal Scalp electrode'; register number 08010.

10.11 If a bradycardia persists for more than 3 minutes, urgent medical aid should be sought and preparations made to expedite the birth of baby. The National Institute for Clinical Excellence (NICE) suggest that preparations should be carried out to expedite the birth of the baby; and although the fetal heart rate may recover the 'preparation stage' should be completed to ensure that no delay occurs if a 'definite delivery' is required.

10.12 If the fetal heart recovers by 9 minutes the decision to deliver should be reconsidered in conjunction with the patient if fetal well being has been established.

10.13 A tachycardia of 160-180bpm, when accelerations are present and no other adverse features, should not be regarded as suspicious. However, an increase in the baseline heart rate, even within the normal range, with other non-reassuring/ abnormal features should raise concerns.

10.14 Continuous EFM in the presence of oxytocin as follows:

- If the FHR trace is classified as suspicious this should be reviewed by the obstetric registrar or consultant and the oxytocin dose should only continue to increase to achieve 4 or 5 contractions every 10 minutes

- If the FHR trace is classified as pathological, oxytocin should be stopped and a full assessment of the fetal condition undertaken by an obstetric registrar or consultant before oxytocin is recommenced

10.15 **Fresh Eyes** - where the CTG is initially classified as normal, systematic assessment of the CTG should be undertaken on an hourly basis. Where a CTG deviates from the normal classification, more frequent assessment and review by the appropriate professional should be initiated. Where a CTG deviates from normal classification, systematic assessment and review should be undertaken on a 30 minutes basis by the appropriate professional.

10.16 The Labour Ward Co-ordinator or Band 7/senior Band 6 midwife will be required to review the CTG on an hourly basis - a **'fresh eyes approach'**; and this is in addition to the assessment of the CTG conducted by the midwife responsible for providing care.

10.17 The midwife responsible for providing care is responsible for requesting the Labour Ward Co-ordinator or another Band 7/ senior Band 6 to come and review the CTG. The midwife responsible should complete the documentation on the intrapartum assessment sticker in the patient's healthcare records, recording **'fresh eyes review'**; indicating the classification overview; and sign the intrapartum assessment sticker in the patient's healthcare records.

10.18 The midwife acting as the 'fresh eyes' should double sign both the assessment on the CTG tracing; recording 'fresh eyes review'; indicating the classification overview (i.e. normal, suspicious or pathological) and the sign the intrapartum assessment sticker in the patient's healthcare records.

10.19 The CTG assessment stickers should be used both in the antenatal and intrapartum settings, to ensure a standardised assessment. Only in the **absolute event when** no stickers are available, should the mnemonic be used i.e. DR C M BRAVADO

10.20 In the case where there is a delay in conducting a 'fresh eyes review' i.e. an epidural procedure; this assessment should occur as soon as possible following the procedure.

11.0 Maternal Position and Oxygen Therapy

11.1 During the presence of abnormal FHR patterns when a patient is lying supine she should be advised to adopt a left lateral position.

11.2 Prolonged use of maternal reservoir facial oxygen therapy may be harmful to the baby and should be avoided. There is no research evidence evaluating the benefits or risks of short-term maternal reservoir facial oxygen therapy in suspected fetal compromise.

12.0 Adjuncts to Continuous EFM

12.1 Digital stimulation of fetal scalp by healthcare professional during a vaginal examination should be considered as an adjunct to continuous EFM

12.2 Fetal blood sampling (FBS) should be advised in the presence of pathological FHR trace, unless there is clear evidence of acute compromise.
(Please refer to the 'Guideline for fetal blood sampling (FBS)'. Register number 08014)

12.3 FBS should be performed in the left lateral position and classified as below:

- ≥ 7.25 Normal
- 7.21 – 7.24 Borderline
- ≤ 7.20 Abnormal

12.4 A normal FBS should be repeated no more than 1 hour later if the FHR trace remains pathological, or sooner if there are further abnormalities.

12.5 After borderline FBS sampling should be repeated no more than 30 minutes and refer to point 10.

13.0 Difficulty with FHR Detection

13.1 In the event there is difficulty in determining the fetal heart beat or an inability to detect a fetal heart with either a pinnard, handheld sonicaid or CTG machine; this should then be confirmed by ultrasound assessment.

13.2 This has to be **confirmed** by an obstetric registrar/consultant on call, with specific training in ultrasound or by a trained sonographer as soon as possible. The mobile ultrasound is located on Labour ward.

13.3 The on-call consultant should be informed of the absent fetal heart beat events and adherance to the 'Guideline for the antenatal, intrapartum and postnatal management of patients with pregnancy loss' (register number 09042)

14.0 Low Risk Units

14.1 If a midwife has a concern with a CTG this should be faxed to the LW and the midwife should discuss with the duty registrar formulating a plan of care.

14.2 In the case of a pathological CTG, the CTG should be faxed to Labour Ward and immediate arrangements made to transfer the patient by ambulance to the Labour Ward. The labour Ward Co-ordinator and obstetrician should be informed of imminent transfer. Prior to transfer the midwife should take appropriate conservative measures and when possible site a venflon and take blood for full blood count (FBC) and group and save.

14.3 If delivery is anticipated the midwife should make preparations to deliver the baby at the low-risk unit ensuring that a second midwife is in attendance ready to initiate resuscitation.

14.4 An ambulance should be called in case the baby is born in a poor condition and requires transfer to the Neonatal Unit (NNU). If transfer is required inform the Labour Ward Co-ordinator who will ensure the paediatric team and the NNU are ready to receive the baby.

15.0 Record Keeping

15.1 It is important that doctors and midwives standardise interpretation of CTG tracings using the NICE classification.
(Refer to Appendix A)

15.2 When a professional has been asked to review the tracing it must be signed by that person and the outcome documented on the tracing and in the health care records.

15.3 Once a pre-birth CTG trace has been completed the responsible midwife should sign the trace with a second midwife or the obstetric registrar/consultant. In addition, the responsible midwife should sign the antenatal CTG sticker and document the outcome in the health care records.

15.4 Following birth, the responsible healthcare professional should sign and note the date, time and mode of birth on the CTG trace.

15.5 All significant events and interventions should be marked on the CTG contemporaneously, signed and timed, including when help has been summoned (if applicable).

15.6 When commencing a CTG the following should be documented on the trace by the responsible professional:

- Woman's name and number
- Date and time of commencement
- Reason for CTG
- Maternal pulse

15.7 Only in the **absolute event when** no stickers are available, should the mnemonic be used i.e. DR C M BRAVADO as follows:
(Refer to point 9.19)

Define **R**isk	'Low' or 'High'
Contractions	Comment on frequency, strength & duration
Baseline **R**ate	Bradycardia, 'normal' or tachycardia
Variability	At least 5-10 beats per minute (persistent variability is a particularly ominous sign
Accelerations	Persistent or absent (at least 15 beats change from baseline lasting 15 seconds
Decelerations	'Early', 'variable' or 'late'

Overall Plan of Assessment (normal, suspicious or pathological Management and plan of management.

15.8 Maternity records are required by law to be stored for 25 years and therefore secure storage of CTG tracings is essential. All CTG's should be inserted firstly into a small brown envelope with the woman's details written on the outside. This envelope should then be inserted into the main CTG envelope, which is secured in the woman's hospital record.

16.0 Staffing and Training

16.1 All midwives and obstetric staff must attend yearly mandatory training which includes skills and drills training, involving electronic fetal monitoring.
(Refer to 'Mandatory training policy for Maternity Services (incorporating training needs analysis. Register number 09062)

16.2 In addition, it is the responsibility of all midwives and obstetric staff to attend a compulsory 6 month electronic fetal monitoring update in the form of a lecture, CTG pack, statutory training or a review of CTG cases on labour ward as a group forum.

16.3 All midwifery and obstetric staff are to ensure that their knowledge and skills are up-to-date in order to complete their portfolio for appraisal.

17.0 Infection Prevention

17.1 All staff should follow Trust guidelines on infection prevention by ensuring that they effectively 'decontaminate their hands' before and after each procedure.

17.2 All staff should ensure that they follow Trust guidelines on infection control, using Aseptic Non-Touch Technique (ANTT) when carrying out procedures i.e. insertion of intravenous cannula.

17.3 All invasive devices must be inserted and cared for using high impact intervention guidelines (refer to Saving Lives policy guideline, DoH, 2007) to reduce the risk of infection and deliver safe care. This care should be recorded in the Saving Lives High Impact Intervention Monitoring Tool Paperwork (Medical Devices).

18.0 Audit and Monitoring

18.1 Audit of compliance with this guideline will be considered on an annual audit basis in accordance with the Clinical Audit Strategy and Policy, the Maternity annual audit work plan and the NHSLA/CNST requirements. The Audit Lead in liaison with the Risk Management Group will identify a lead for the audit.

18.2 As a minimum the following specific requirements will be monitored:

- Equipment that should be used
- When to palpate the maternal pulse
- When to auscultate the fetal heart
- Length of auscultation
- When to transfer from intermittent auscultation to continuous electronic fetal monitoring
- Documentation of all of the above
- Date and time checks on EFM machines
- The minimum data that should be recorded on the tracing, to include:

    i. Patient's name
    ii. Date and time
    iii. Hospital number
    iv. Any intrapartum events; which should be recorded at the time of the event, signed and the time noted
    v. The requirement for those who provide an opinion on the tracing during labour to record this on the trace as well as in the health records
    vi. Data to be included at the completion of the tracing

- When to monitor in labour
- Hourly systematic assessment of the trace
- The actions to be taken in the event that the tracing is assessed as suspicious or pathological
- The maternity service's expectations in relation to staff training, as identified in the training needs analysis

18.3 A review of a suitable sample of health records of patients to include the minimum requirements as highlighted in point 18.2 will be audited. A minimum compliance 75% is required for each requirement. Where concerns are identified more frequent audit will be undertaken.

18.4 The findings of the audit will be reported to and approved by the Multi-disciplinary Risk Management Group (MRMG) and an action plan with named leads and timescales will be developed to address any identified deficiencies. Performance against the action plan will be monitored by this group at subsequent meetings.

18 The audit report will be reported to the monthly Maternity Directorate Governance Meeting (MDGM) and significant concerns relating to compliance will be entered on the local Risk Assurance Framework.

18.6 Key findings and learning points from the audit will be submitted to the Patient Safety Group within the integrated learning report.

18.7 Key findings and learning points will be disseminated to relevant staff.

19.0 Guideline Management

19.1 As an integral part of the knowledge, skills framework, staff are appraised annually to ensure competency in computer skills and the ability to access the current approved guidelines via the Trust's intranet site.

19.2 Quarterly memos are sent to line managers to disseminate to their staff the most currently approved guidelines available via the intranet and clinical guideline folders, located in each designated clinical area.

19.3 Guideline monitors have been nominated to each clinical area to ensure a system whereby obsolete guidelines are archived and newly approved guidelines are now downloaded from the intranet and filed appropriately in the guideline folders. 'Spot checks' are performed on all clinical guidelines quarterly.

19.4 Quarterly Clinical Practices group meetings are held to discuss 'guidelines'. During this meeting the practice development midwife can highlight any areas for further training; possibly involving 'workshops' or to be included in future 'skills and drills' mandatory training sessions.

20.0 Communication

20.1 A quarterly 'maternity newsletter' is issued and available to all staff including an update on the latest 'guidelines' information such as a list of newly approved guidelines for staff to acknowledge and familiarise themselves with and practice accordingly.

20.2 Approved guidelines are published monthly in the Trust's Focus Magazine that is sent via email to all staff.

20.3 Approved guidelines will be disseminated to appropriate staff quarterly via email.

20.4 Regular memos are posted on the guideline notice boards in each clinical area to notify staff of the latest revised guidelines and how to access guidelines via the intranet or clinical guideline folders

21.0 References

National Institute for Clinical Excellence (2007) Intrapartum Care: Management and delivery of care to woman in labour. NICE. September.

E, Chandraharan; S, Arulkumaran. (2007) Prevention of birth asphyxia: responding appropriately to cardiotocograph (CTG) traces, Best Practice and Research Clinical Obstetrics and Gynaecology Volume 21, Issue 4 August, pages 609-624.

Sonicaid fetalcare clinical application guide, Issue 1.3 (c) 2005 Huntleigh Healthcare Ltd

B, Schifrin. (2004) The CTG and the timing and mechanism of fetal neurological injuries, Best Practice and Research Clinical Obstetrics and Gynaecology Volume 18, Issue 3 June, pages 437-456.

B, Williams; S, Arulkumaran. (2004) Cardiotocography and medicolegal issues, Best Practice and Research Clinical Obstetrics & Gynaecology Volume 18, Issue 3 June pages 457-466.

Medical Device Alert (MDA/2010/054) issued 28th June 2010

Appendix A

Classification of EFM Components

(NICE 2007)

	Baseline (bpm)	Variability (bpm)	Decelerations	Accelerations
Reassuring	110 – 160	>5	None	Present
Non-Reassuring	100 - 109 161 - 180	<5 For 40–90 minutes	Typical variable over 50% of contractions over 90 minutes Single prolonged for up to 3 minutes	Absence of otherwise normal trace has no significance
Abnormal	< 100 >180 sinusoidal pattern for > 10 minutes	<5 For >90 minutes	Either atypical variable with over 50% of contractions (or) late decelerations for over 30 minutes Single prolonged more than 3 minutes	